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GREAT LAKES FORESTRY CENTRE
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Results of forest insect and disease surveys in the SOUTHWESTERN REGION of Ontario, 1986

CARRIED OUT BY THE GREAT LAKES FORESTRY CENTRE IN COOPERATION WITH THE ONTARIO MINISTRY OF NATURAL RESOURCES

H. Brodersen and W. D. Biggs
Miscellaneous Report No. 54

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THE GREAT LAKES FORESTRY CENTRE

The Great Lakes Forestry Centre is one of six regional centres located across Canada and operated by the Canadian Forestry Service. The Service provides federal leadership and a national focus in the forestry sector for the continuing economic, social and environmental benefit of Canadians. The Centre conducts two major programs: research and technical services, and forestry development. Both programs address major problems affecting forest management and the forested environment in Ontario. Because of the transprovincial nature of the forest resource, many elements of the research program are of national significance.

For many years the research program was guided by the Canada-Ontario Joint Forestry Research Committee, made up of senior members of the Centre and the Ontario Ministry of Natural Resources. Responsibilities for coordinating all forestry research in Ontario have now been assumed by the Ontario Forestry Research Committee, which has representatives from forest industry, universities and federal and provincial governments. This Committee also ensures that research results are transmitted to forest managers.

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The Centre recognizes that forested land must be managed in the best public interest, not only for the wood production essential to our economy but also for the recreational purposes that are so important to our social well-being. These goals must be achieved in a manner that will maintain or improve the quality of the forest environment and preserve it for generations to come.

RESULTS OF FOREST INSECT AND DISEASE SURVEYS IN THE SOUTHWESTERN REGION OF ONTARIO 1986

(FOREST DISTRICTS: OWEN SOUND, WINGHAM, CHATHAM, AYLMER AND SIMCOE)

H. BRODERSEN and W.D. BIGGS

GREAT LAKES FORESTRY CENTRE

CANADIAN FORESTRY SERVICE

GOVERNMENT OF CANADA

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SURVEY HIGHLIGHTS

This report deals with forest insects and diseases encountered in the course of regular and special surveys carried out during the 1986 field season in the Southwestern Region of Ontario. The cedar leafminer infestation on the Bruce Peninsula collapsed. Oak skeletonizer damage remains low but persistent, and both spruce budworm and oak leaf shredder populations remain endemic. Both the incidence and damage caused by the walnut caterpillar and the maple trumpet skeletonizer decreased noticeably. Birch leafminer damage, though widespread, was minor for the most part. There are now three recognized infestations of gypsy moth in the Simcoe District, and egg masses were recorded for the first time in the Aylmer District (exclusive of the old Westmount infestation in the city of London). Also, for the first time, all pheromone traps deployed for the gypsy moth across the region were positive. An expanded survey for the white pine weevil showed low levels of damage in infested plantations. Damage by the European pine shoot moth was routinely encountered in the Aylmer and Simcoe districts.

Neither race of Scleroderris canker was found in the course of ground and aerial surveys. A highly visible form of a rust of eastern red cedar was recorded throughout the region and tip blight on Scots pine was noted at severe damage levels near several provincial parks. Checks of sugar maple plots showed no evidence of any decline. The plantation survey of 1986 concentrated on eastern white pine in southern Ontario, and a comprehensive analysis of eastern white pine cones from the St. Williams Forest Station for cone and seed pests was undertaken by laboratory personnel of the Forest Insect and Disease Survey Unit.

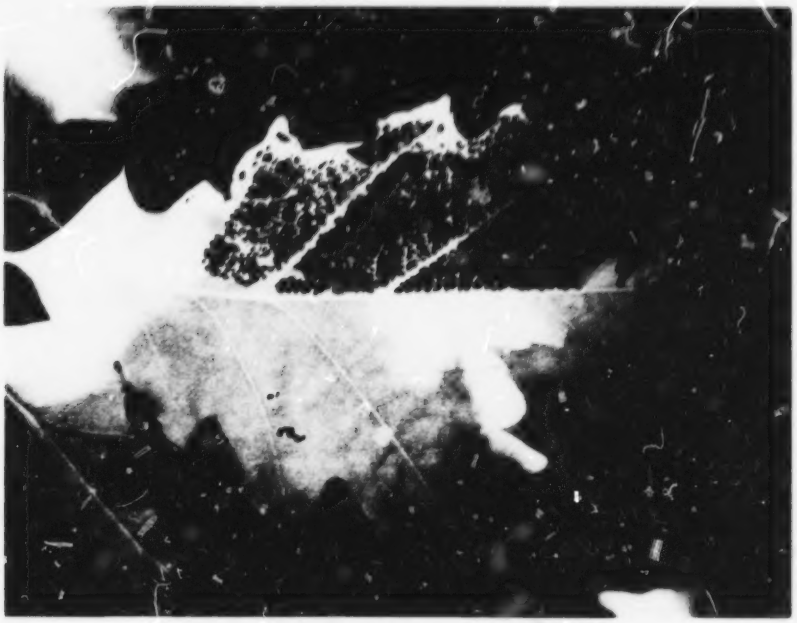
The presence of the pinewood nematode has now been confirmed in three townships of the Southwestern Region, and a third acid rain plot was established in an oak stand at the St. Williams Forest Station in South Walsingham Township, Simcoe District. The authors wish to extend their thanks to the Ontario Ministry of Natural Resources and all other supporting agencies and individuals for their assistance in the 1986 field season.

As in previous years, pests described in this report are categorized as follows:

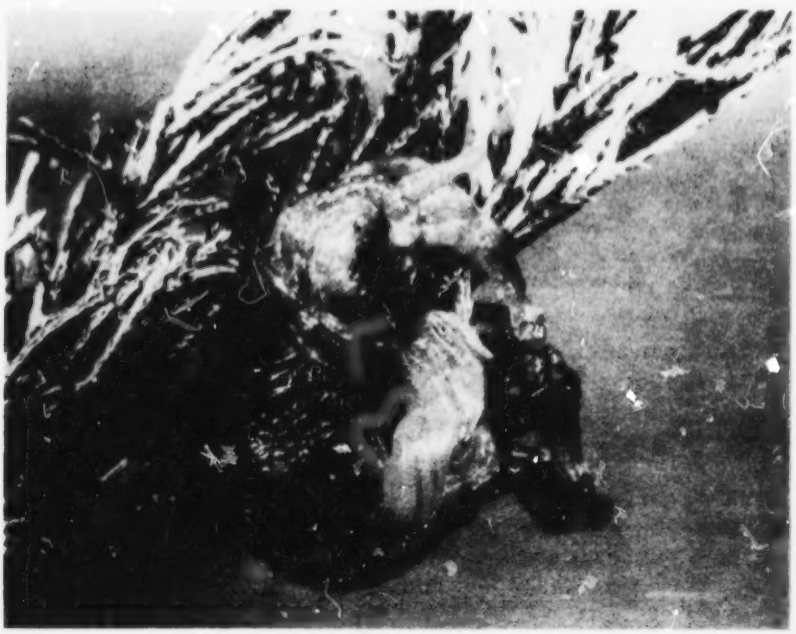
Major Insects/Diseases

Capable of causing serious injury to or death of living trees or shrubs

Frontispiece



Foliar damage on an oak leaf by larval feeding of the oak skeletonizer, *Bucculatrix ainsliella* Murt.



Gelatinous spore horn caused by the globose gall rust, *Gymnosporangium globosum* Farlow

*Minor Insects/Diseases**

capable of causing sporadic or localized injury but not usually a serious threat to living trees or shrubs

Other Forest Insects/Diseases (Tables)

These tables provide information on two types of pest:

(1) those that are of minor importance and have not been known to cause serious damage to forest trees;

(2) those that are capable of causing serious damage but, because of low populations or for other reasons, did not cause serious damage.

* No minor diseases were reported in the Southwestern Region in 1986.

H. Brodersen

W.D. Biggs

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INSECTS

Major Insects

Cedar Leafminers, *Argyresthia aureoargentella* Brower, *A. canadensis* Free., *A. thuiella* (Pack.), and *Coleotechnites thujaella* (Kft.)

The 1,400-ha infestation of 1984, located across the townships of St. Edmunds, Lindsay and Eastnor in the Owen Sound District, which had remained largely intact during 1985, fragmented into innumerable small (< 1 ha) pockets of light-to-moderate (10-40%) foliar damage as determined by spring surveys. Small pockets of low levels of foliar damage were commonly noted throughout the district, most frequently, however, in the townships of Normanby, Egremont and Artemesia. A single 10-ha pocket of severe damage (80-100%) recorded throughout an area of young cedar (*Thuja occidentalis* L.) near Pike Bay, Albemarle Twp constituted the only heavy damage encountered in the Owen Sound District.

Throughout the balance of the region damage by this leafminer complex was much the same as reported in 1985, specifically, a high incidence of attacked hedgerows and windbreaks with trace (1-5%) foliar damage levels, as determined by a 25-township survey through four districts. Surveys in the Wingham District disclosed the highest frequency of positive checks (90%) for leafminer; at these locations, 66% of all trees examined suffered trace-to-low levels (1-5%) of foliar damage. Across the Aylmer District 85% of all locations checked had an average of 5% damage on 42% of the trees examined. Throughout the Simcoe and Chatham districts approximately 60% of all locations checked revealed only low levels of damage.

Oak Skeletonizer, *Bucculatrix ainsliella* Murt.

This skeletonizer was found at various levels of incidence and damage in approximately half of the oak (*Quercus* spp.) woodlots examined (see Frontispiece). The majority of significant populations, however, were encountered in the Aylmer District. No significant damage was detected in the Owen Sound, Wingham, Chatham or Simcoe districts except for a single 5-ha woodlot in Townsend Twp, Simcoe District, where 100% of all oak examined had an average of 20% foliar damage. (Foliar damage estimates represent the cumulative damage of two generations.)

Across the Aylmer District significant numbers of larvae were commonly found on red oak (*Quercus rubra* L.) and black oak (*Q. velutina* Lam.), most notably in the townships of Bayham, North Dorchester and Lobo. Across the district, the average incidence of attack and foliar damage on examined trees were 100% and 35%, respectively; the highest damage recorded was on red oak in a 10-ha woodlot located in Lobo Twp, where all of the trees surveyed had an average of 50% foliar damage. Over all, damage across the region remains low (5-25%), with most locations averaging < 5%.

Spruce Budworm, *Choristoneura fumiferana* (Clem.)

Results of damage surveys, population sampling and egg-mass counts of the spruce budworm will be published with those of other regions at a later date in a report devoted specifically to this insect. The report will provide a complete description and analysis of developments in the spruce budworm situation in Ontario in 1986 and will give infestation forecasts for the province for 1987.

Oak Leaf Shredder, *Croesia semipurpurana* (Kft.)

Over the previous 10 years, populations of this defoliator have remained at or near low levels in scattered pockets throughout the region. During this time, only one small pocket of severe defoliation (80%) on red oak was noted at Emmet Lake, St. Edmunds Twp, in Owen Sound District. This infestation occurred in 1980 and collapsed the following year.

Surveys of woodlots across the region in 1986 once again revealed only low or endemic, widely scattered populations, with foliar loss averaging less than 10% in most stands affected. Defoliation forecasts based on egg-densities, along with defoliation estimates and pheromone trapping results, are given in Table 1.

Walnut Caterpillar, *Datana integerrima* G. & R.

The widespread defoliation noted in 1985 did not recur in 1986 as populations collapsed to low levels throughout the region. Defoliation of black walnut (*Juglans nigra* L.) was once again noted in all districts; however, the presence of the walnut caterpillar was observed at significantly fewer locations this year than the previous year.

Hay Township, Wingham District, provided the most northerly collection made in this region. Low-to-moderate defoliation (5-75%) was occasionally noted. The highest incidence (100%) of defoliated trees occurred in Brooke Township, Chatham District, on open-grown walnuts that suffered 90% defoliation on average. However, defoliation was neither widespread nor frequent in this district, as it was in Aylmer District. Black walnut in the townships of Houghton, South Walsingham and Charlotteville in the Simcoe District appears to be the most heavily attacked species. Typically, more than 90% of affected walnuts (including scattered individuals, clumps and hedgerows) suffered 10-90% defoliation.

Table 1. Results of oak leaf shredder pheromone trapping, egg counts and defoliation forecasts for two districts in 1986 (five traps deployed at each location).

Location	Total no. of adults captured 1986	Avg. no. per trap 1986	Concentration of pheromone (%)	Leaves attacked 1986 (%)	Foliar damage 1986 (%)	No. of eggs 1985	No. of eggs 1986	Defoliation forecast for 1987
Chatham District								
Bosanquet Twp (Pinery Prov. Park)	0	0	0.003	1.3	2.9	0	0	nil
Simcoe District								
Charlotteville Twp (Turkey Pt Prov. Park)	0	0	0.003	7.0	9.5	0	0	nil
Walsingham Twp (St. William Forest Station)	1	0	0.03	5.0	9.0	0	1	low

Maple Trumpet Skeletonizer, *Epinotia aceriella* (Clem.)

Widespread populations, primarily on sugar maple *(Acer saccharum* Marsh.), have been recorded at various levels of damage and incidence for the past six years in the Southwestern Region. Low levels of foliar damage were once again noted throughout much of the work area, the main exception being in the Chatham District, where routine surveys failed to detect any significant populations.

Throughout the Wingham District, continuing high populations infested 80% of the woodlots examined, wherein 82% of the sugar maples suffered low levels of foliar damage (5%). Across the Simcoe District, 50% of all woodlots inspected contained trees that had been attacked. Foliar damage in all instances remained low, averaging < 10%.

With few exceptions the majority of the woodlots surveyed in the Aylmer District failed to reveal any evidence of this pest. However, for the seventh consecutive year a high incidence of attack (90%) combined with significant foliar damage (40%) was recorded in the infestation (27 ha) that persists in John E. Pearce Provincial Park. No discernible branch damage or other damage has been identified at this location as this late-season feeder poses what is primarily an aesthetic problem.

Only trace levels of foliar damage were encountered across the Owen Sound District.

Birch Leafminer, *Fenusa pusilla* (Lep.)

The number of trees attacked by this leafminer throughout the region was once again very high, while foliar damage levels with few exceptions were low (5-25%). First-generation larvae attacked on average 73% of all ornamental white birch *(Betula papyrifera* Marsh.) examined; second-generation leafminers accounted for an additional 5% foliar damage on 62% of the trees surveyed.

The highest level of foliar damage recorded occurred in Lobo Township, Aylmer District along county road 17, where 20% of the open-grown roadside trees suffered > 75% foliar damage. The highest rate of attacked trees (100%), albeit at insignificant foliar damage levels (2%), was recorded across the Wingham District. Populations higher than those encountered in 1985 in Osprey Township, Owen Sound District accounted for average foliar losses of 50% on scattered regeneration.

Fall Webworm, *Hyphantria cunea* (Dru.)

The total number of trees attacked by this pest decreased for the second consecutive year throughout the region. The number of webs per tree seldom exceeded one in most areas, but virtually all species of deciduous trees hosted webs.

There was a pronounced reduction in the number of trees attacked in the Wingham District. Routine checks there disclosed positive counts at trace-to-low (1-25%) foliar damage levels in 5 of 13 townships surveyed.

The Chatham and Aylmer districts both had uniformly widespread populations, albeit at low foliar damage levels (5-15%); 23 of 25 townships checked throughout these two districts hosted populations.

Webs were noted throughout the entire Simcoe District, yet foliar damage was generally low. The number of trees attacked within a given kilometre travelled varied greatly (1-24 km) depending on the area. The most prominent concentration of webs observed was along regional road 10 south of Highway 24 in Charlotteville Township.

Widely scattered single webs were routinely encountered in the Owen Sound District. A single small stand (<1 ha) of young balsam poplar (*Populus balsamifera* L.) hosted a significant webworm population in Lindsay Township. However, foliar damage remained low (5%).

Gypsy Moth, *Lymantria dispar* (L.)

Burlap and pheromone traps were deployed at 12 provincial parks in 1986 as part of a continuing effort to monitor gypsy moth populations (Table 2). This year for the first time male moths were captured at all 12 locations. Increased numbers of moths were trapped at all but two locations, Longpoint and Selkirk provincial parks; counts at these parks (on a per-trap basis) were comparable to those in 1985.

No larval captures were reported this summer by the Ontario Ministry of Natural Resources (OMNR) personnel responsible for monitoring burlap traps in their respective provincial parks.

A mid-July aerial survey of known infestations and suspect stands (primarily along the shorelines of Lake Erie in the Simcoe District and Lake Huron south of Grand Bend in the Chatham District) failed to reveal and defoliation discernible from the air.

Over the past two years the combined resources of OMNR, the Plant Health Division of Agriculture Canada and the Forest Insect and Disease Survey Unit (FIDS) of the Canadian Forestry Service have identified seven locations in five townships throughout three districts where gypsy moth is present, either as egg-masses or as larvae, or as both (Fig. 1).

Egg masses were first reported in Moore Township, Chatham District, on roadside bur oak (*Quercus macrocarpa* Michx.) in 1985. No new egg masses were noted at this location in 1986, and a downwind check of the nearest hardwood stand (5 ha) did not reveal any further evidence of this insect.

SOUTHWESTERN REGION

Figure 1. Gypsy Moth, *Lymantria dispar* (L.)
1985-1986 confirmed larval or egg-mass locations . . . . . ●

Forest Insect and Disease Survey
Great Lakes Forestry Centre

Table 2. Results of gypsy moth pheromone and burlap trapping in 1986.

Location (Park)	No. of burlap traps	No. of larvae caught	No. of pheromone traps	No. of male moths caught
Aylmer District				
Iroquois Beach	10	0	2	12
Chatham District				
Rondeau	10	0	2	20
Ipperwash	10	0	1	4
Pinery	10	0	2	17
Owen Sound District				
Craigleith	10	0	2	10
Cyprus Lake	10	0	2	24
Sauble Falls	10	0	2	4
Inverhuron	10	0	2	19
MacGregor Pt	10	0	2	5
Simcoe District				
Long Point	10	0	1	4
Selkirk	10	0	2	28
Wingham District				
Points Farm	10	0	2	29

In the Aylmer District larvae were identified at low numbers at a private residence on Lynngate Place Road in the Westmount area of the city of London. (This area was the site of a previously documented infestation.) Elsewhere in the Aylmer District, egg masses were confirmed on roadside bur oak in Dunwich Township on County Road 8 along the fourth concession; downwind checks of roadside trees in the immediate area failed to disclose any further presence of the gypsy moth.

Formal surveys executed in the Simcoe District revealed that egg-mass densities in the 40-ha infestation of Turkey Point Provincial Park, Charlotteville Township, fell appreciably from those noted in 1985, specifically from 172/ha in 1985 to 25/ha in 1986. The smaller 4-ha infestation of 1985 located in the Wilson Tract, South Walsingham Township expanded to approximately 9.3 ha, and there was an increased egg-mass density of 494/ha, almost double the 295/ha reported the previous year. Low levels of discernible defoliation can be expected at egg-mass densities of 500/ha. A second area (< 1 ha) with significant egg-mass densities (approximately 699/ha) was documented in the Hodges Tract, South Walsingham Township. A few larvae were also collected from the grounds of St. Williams Forest Station.

Forest Tent Caterpillar, *Malacosoma disstria* Hbn.

Concerns about the possibility of increased populations of this caterpillar throughout portions of central Ontario prompted special fall egg-band surveys for the purposes of forecasting defoliation for 1987. The Owen Sound District was included in this survey.

The forest tent caterpillar was one of several factors involved in a serious decline of sugar maple in the late 1970s in the Owen Sound District. Throughout the central portion of this district a total of 11 sugar maple stands in six townships were surveyed and defoliation forecasts for 1987 at all locations were nil.

Elsewhere in the region routine surveys did not disclose any significant populations.

White Pine Weevil, *Pissodes strobi* (Peck)

During the summer, 26 white pine (*Pinus strobus* L.) plantations in five districts were examined for damaged leaders (Table 3). Of the plantations examined, 30% sustained some degree of damage, although generally this was low. The highest rate of attack recorded was once again in the Woodstock Public Utilities Commission plantations located in West Oxford Township, Aylmer District.

European Pine Shoot Moth, *Rhyacionia buoliana* (D. & S.)

This pest was commonly found in young red pine (*Pinus resinosa* Ait.) and Scots pine (*P. sylvestris* L.) plantations in the Aylmer and Simcoe districts. The high rates of attack and low damage levels recorded below (usually 1-3 lateral shoots per tree) are typical of those encountered.

The highest rate of attack recorded (36%) was on 0.5-m Scots pine in a 7.5-ha plantation located in Zorra Township, Aylmer District.

On average, two shoots per tree were lost to this pest on 26% of the Scots pine (1.5 m) examined in a 1-ha plantation located in South Walsingham Township, Simcoe District.

Table 3. Summary of leader damage by white pine weevil in five districts in 1986 (counts based on the examination of 100 white pine trees at each location).

Location (Twp)	Avg height of trees (m)	Approximate stocking (trees/ha)	Area affected (ha)	Leaders attacked (%)	
				1985	1986
Aylmer District					
Bayham	2.5	1415	2.5	0	0
Delaware	3.0	2900	13.0	na	0
Dereham	4.5	2900	3.2	na	0
Lobo	2.0	2375	0.6	0	0
Mosa	2.5	2320	5.0	na	0
N. Dorchester	4.3	1990	5.0	na	0
W. Oxford	3.0	2990	3.0	9	10
E. Zorra	5.0	1990	1.5	na	0
W. Zorra	4.5	2900	1.3	na	0
Yarmouth	4.1	2900	2.5	na	0
Chatham District					
Zone	1.7	2990	0.8	na	0
Owen Sound District					
Sullivan	2.0	2990	10.0	na	1
Simcoe District					
Charlotteville	2.5	2300	1.5	2	4
Charlotteville	1.9	2900	1.6	na	3
S. Walsingham	6.0	2900	0.6	na	2
N. Walsingham	5.0	3600	2.0	13	7
Windham	4.0	1000	0.4	13	3
Woodhouse	4.0	1900	3.5	1	1
Wingham District					
Blanshard	4.0	1250	1.2	2	0
Carrick	2.0	1990	1.2	na	0
Goderich	2.5	1780	0.6	0	0
Goderich	3.0	2900	1.3	na	0
Hullett	3.5	1200	50.0	0	0
Kinloss	4.2	2900	10.0	na	1
Morris	5.0	2900	4.0	na	0
Mornington	5.0	2900	3.3	na	0
Turnberry	2.3	2900	0.5	na	0

na = not available

Minor Insects

Introduced Pine Sawfly, *Diprion similis* (Htg.)

This sawfly was noted at low numbers (on average fewer than 12 per tree) on eastern white pine in several plantations across the northern portions of the region.

The incidence of attacked trees varied; in the Owen Sound District, plantations in Saugeen, Eastnor and Amabel townships revealed incidence rates of 1%, 2%, and 10%, respectively. A small plantation (< 1 ha) of 2-m-tall trees located in Carrick Townhsip, Wingham District suffered the highest incidence of attacked trees (12%) of all plantations surveyed; however, foliar damage was typically low (< 5%).

Table 4. Other forest insects.

Insect	Host(s)	Remarks
Acrobasis juglandis (LeB.) Pecan leaf casebearer	bWa	low numbers on 4% of 1.5-m trees in a plantation (<1 ha) in Raleigh Twp, Chatham District, and on 60% of 2-m plantation trees (<1 ha) causing 10% defoliation in W. Nissouri Twp, Aylmer District
Adelges abietis (L.) Eastern spruce gall adelgid	wS	numerous galls on 8% of 2-m trees in a <1-ha plantation in Dereham Twp, Aylmer District
Anisota senatoria (J.E. Smith) Orangestriped oakworm	bO	noted infrequently in E. Tilbury Twp, Chatham District and Southwold and Dunwich twps, Aylmer District stripping roadside trees of an average of 55% of their foliage
Aphrophora cribrata (Wlk.) Pine spittlebug	ScP	low numbers on 100% of 2.5-m roadside trees with low levels of twig mortality in Huron County Forest, Colborne Twp, Wingham District
Cameraria hamadryadella (Clem.) Solitary oak leafminer	bO	high numbers of mines on 100% of trees examined in a 1-ha woodlot in Townsend Twp, Simcoe District
Cecidomyia ocellaris (O.S.) Ocellate gall midge	sM	low levels of foliar damage (< 5%) on 4% of trees in a 3-ha woodlot in Mosa Twp, Aylmer District
Cecidomyia verrucicola O.S. Linden wartgall midge	Ba	numerous galls noted on 10% of trees in a 1-ha woodlot in Caradoc Twp, Aylmer District and on 60% of trees in a single woodlot in McKillop Twp, Wingham District; foliar damage < 10% in both instances

(cont'd)

Table 4. Other forest insects (cont'd).

Insect	Host(s)	Remarks
Choristoneura pinus pinus Free. Jack pine budworm	jP	A reduction in population levels resulted in trace numbers of larvae only in St. Edmunds and Lindsay twps, Owen Sound District.
Coleophora laricella (Hbn.) Larch casebearer	tL	light damage (<10%) noted on a small number of young plantation trees in Bentinck Twp, Owen Sound District
Coleotechnites piceaella (Kft.) Orange spruce needleminer	wS	This insect was commonly found throughout Owen Sound, Chatham, Aylmer and Simcoe districts in hedgerows at high incidence; more than 60% were affected, and foliar damage was low (< 5%)
Dioryctria reniculelloides Mut. & Mun. Spruce coneworm	wP	damaged new shoots (avg of 1/tree) on 10% of 3-m trees in Delaware Twp, Aylmer District
Hylobius radicis Buch. Pine root collar weevil	wP	accounted for a mortality rate of 1.3% in a 6-ha plantation of <2-m trees in Saugeen Twp, Owen Sound District
Neodiprion lecontei (Fitch) Redheaded pine sawfly	rP	various levels of defoliation ranging from 10% to 100% on 40% of 1-m trees on Saugeen Valley Conservation Authority property in Arran Twp, Owen Sound District

(cont'd)

Table 4. Other forest insects (cont'd).

Insect	Host(s)	Remarks
Neodiprion sertifer (Geoff.) European pine sawfly	AuP,ScP	decreased populations noted at all surveyed locations in the region; trace numbers only noted in ScP plantations in Holland, Bentinck and Lindsay twps, Owen Sound District as well as on 5% of 3-m Au? in a plantation (< 1 ha) in N. Walsingham Twp, Simcoe District
Operophtera bruceata (Hlst.) Bruce spanworm	sM	low levels of defoliation (<10%) in the upper canopy of a 4-ha woodlot in Collingwood Twp, Owen Sound District
Orgyia leucostigma intermedia Fitch White marked tussock moth	bO	several ornamentals 90% stripped at a single location in N. Tilbury Twp, Chatham District
Pantographa limata G. & R. Basswood leafroller	Ba	low numbers of leafrollers causing <5% damage on a few mature woodlot trees (1.2 ha) in Malahide Twp, Aylmer District
Pineus strobi (Htg.) Pine bark adelgid	wP	low numbers noted on 9.3% of 5-m trees in a 1-ha plantation in Howick Twp, Wingham District
Pissodes approximatus Hopk. Northern pine weevil	wP	mortality rates of 6% noted in a <1-ha plantation of 2-m trees in Windham Twp, Simcoe District; 1% in a 6-ha plantation of 2-m trees in Windham Twp, Simcoe District; and 1% in a 6-ha plantation of 2-m trees in Saugeen Twp, Owen Sound District

(cont'd)

Table 4. Other forest insects (concl.).

Insect	Host(s)	Remarks
Pristophora geniculata (Htg.) Mountain-ash sawfly	Mo	a few small trees totally defoliated (100%) in Craiglieth Prov. Pk, Collingwood Twp, Owen Sound District
Vasates quadriped Shim. Maple bladdergall mite	SiM	Foliar damage averaged 50% on 55% of semimature trees in a 2.5-ha woodlot, Walpole Twp, Simcoe District.
Zeiraphera canadensis Mut. & Free. Spruce bud moth	wS	very little evidence of this pest in the region in 1986; the most notable damage recorded was 5-15% foliar damage on 60% of a 3-m hedgerow in Howard Twp, Chatham District
Zeiraphera unfortunana Powell (=*destitutana* Mut. & Free.) Purplestriped shootworm	wS	trace damage levels (< 1%) to new shoots; common on scattered young individuals, Ellice Swamp, Ellice Twp, Wingham District

TREE DISEASES

Major Diseases

Scleroderris Canker, *Ascocalyx abietina* (Lagerb.) Schläpfer-Bernhard

The expanded version of this annual survey was conducted for the second consecutive year in 1986. The 1986 survey comprised 32 red pine plantations across 16 townships throughout five districts and included an aerial reconnaissance of randomly located plantations in the Simcoe District. All of the ground checks and suspect sample submissions proved negative for both the native and the European races (Fig. 2).

Globose Gall Rust, *Gymnosporangium globosum* Farlow and
Cedar-apple Rust, *Gymnosporangium juniperi-virginianae* Schwein.

These rusts of junipers (*Juniperus* spp.) were commonly noted throughout the region causing varying levels of damage to most native and ornamental trees. The majority of the infections identified were due to the globose gall rust (see Frontispiece). The principal alternate hosts for this rust and cedar-apple rust are hawthorn (*Crataegus* spp.) and apple (*Malus* spp.), respectively. These deciduous hosts release spores in August that infect the new shoots and leaves of junipers. By the second spring after spore release, galls have formed on the junipers. During wet periods in the spring these galls exude orange gelatinous spore horns which often liberate spores that reinfect the alternate deciduous hosts. After the galls have released their spores they normally die. The galls of *G. globosum*, however, are often perennial, producing spores for several successive seasons. Severe infections of *G. juniperi-virginianae* can stunt shoot growth sufficiently to retard normal tree development and in time cause mortality. Across the region, 77% of all junipers examined hosted varying numbers of galls.

Tip blight, *Sphaeropsis sapinea* (Fr.) Dyko & B. Sutton

During routine surveys this virulent disease was recorded at three widely separated locations in the region. The fungus was isolated from the needles of a single moribund Austrian pine (*Pinus nigra* Arnold) situated among several other scattered individuals of the same species at Holiday Beach Provincial Park in Malden Township, Chatham District. Trace levels of tip dieback were also confirmed on young Austrian pine at Sauble Falls Provincial Park in Amabel Township, Owen Sound District. The most pronounced damage was encountered on mature Scots pine (*Pinus sylvestris* L.) along regional road 10 south of Highway 24 in Simcoe District between the Turkey Point Provincial Park entrance and the five corners intersection. Foliar damage, including bud, shoot and branch mortality, averaged 35% on 87% of all trees evaluated.

Pruning of infected branches is pointless as the scales of second-year cones are a major source of inoculum; however, a fungicide application in spring is helpful in reducing infection on new shoots.

SOUTHWESTERN REGION

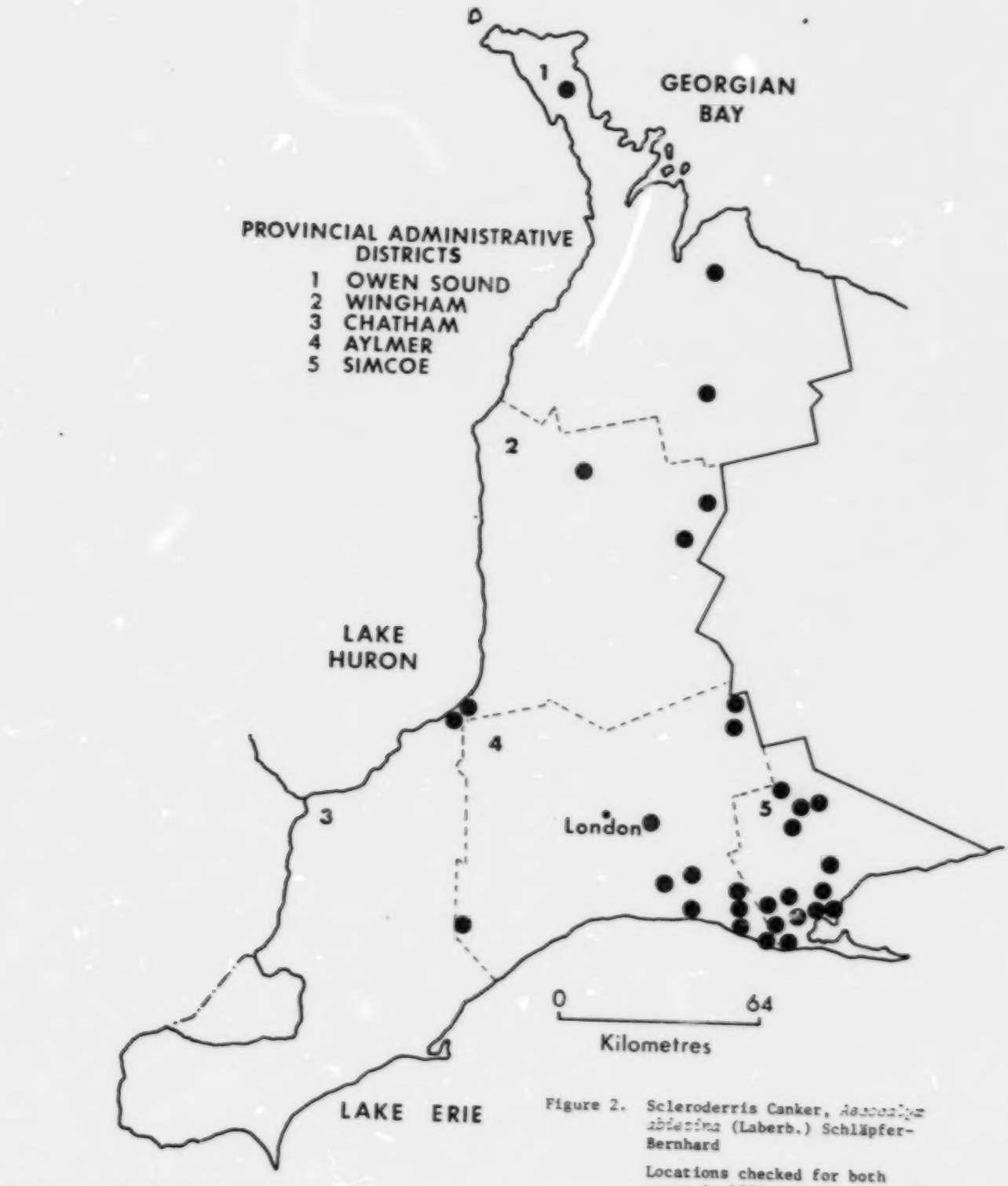

Figure 2. Scleroderris Canker, *Ascocalyx abietina* (Laberb.) Schläpfer-Bernhard

Locations checked for both races in 1986 . . . . . ● (all negative)

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Table 5. Other forest diseases.

Organism	Host(s)	Remarks
Apiognomonia quercina (Kleb.) Höhnel Anthracnose	sO	Several scattered ornamentals had varying levels of branch mortality (up to 40%) in Woodhouse Twp, Simcoe District.
Apiognomonia veneta (Sacc. & Speg.) Höhnel Anthracnose	Sy	On 12 of 15 street ornamentals in the town of Delhi, Simcoe District, branch mortality averaged 10-20%.
Asteroma caryae (Peck) B. Sutton Leaf spot of hickory	sHi	commonly noted in the Chatham, Aylmer and Simcoe districts; incidence of trees attacked across the districts was 79% (usually in small pockets < 1 ha), with foliar damage averaging 55%; most notable damage in Selkirk Provincial Park, Walpole Twp, Simcoe District, where 100% of all host trees over approx. 20 ha suffered 10% foliar damage
Diplodina acerina (Pass.) Diplodina leaf spot	sM	isolated as one of the causes of thin crowns and branch dieback among rural roadside trees in Osprey Twp, Owen Sound District
Discula campestris (Pass.) v. Arx Anthracnose	sM	recorded causing 15% foliar damage to 32% of mature woodlot trees (0.8 ha) in Logan Twp, Wingham District
Guignardia aesculi (Peck) Stewart Stewart Leaf blotch	Che	This leaf blotch was commonly noted once again throughout the entire work area; the regional average of affected trees was 89% and foliar damage amounted to 30%. The highest incidence recorded was in Chatham District, where 100% of all trees examined had an average of 47% foliar damage.

(cont'd)

Table 5. Other forest diseases (concl.).

Organism	Host(s)	Remarks
Marssonina juglandis (Lib.) Magnus Hickory leaf spot	bWa	This fungus caused premature leaf drop on most trees examined throughout the region. The average incidence of attacked trees and foliar damage across all districts were 70% and 30%, respectively.
Microstroma juglandis (Bereng.) Sacc. White mold	sHi	a single occurrence noted in a 2-m hedgerow in London Twp, Aylmer District, where 20% of all trees sustained 5% foliar damage
Septoria populicola Peck Leaf spot	Po	This fungus was noted frequently throughout the host range in all districts; on average, 40% leafdrop was noted on 79% of all trees examined in the region. The highest incidence of attacked trees examined (100%) was in the Chatham District; associated leafdrop was 55%.
Tubakia dryina (Sacc.) B. Sutton Leaf spot	bl0	Several mature woodlot trees had 100% of their foliage damaged in a small woodlot in Charlotteville Twp, Simcoe District.

DIEBACKS AND DECLINES

Oak Decline

Oak decline plots have been monitored annually for 10 years, and vigor of the monitored trees has continued to improve markedly over the past three years. At this writing, 90% or more of the trees in all three plots are in the lowest cumulative dieback class (0-20%) (Table 6). Under the current system of crown classification, when the damaged portion of a crown is superseded by new growth, the old damaged area is discounted in the overall evaluation of the crown condition. No significant defoliation by the oak leaf shredder has occurred in these plots over the past decade.

Maple Decline

The crown condition of four randomly located sugar maple plots (one each in the Aylmer, Chatham, Owen Sound and Wingham districts) has not changed discernibly in the three years during which they have been monitored. To date, no significant crown deterioration has been noted at any of these locations.

Table 6. Summary of oak decline at three locations in the Southwestern Region (100 red and/or white oak trees examined at each location).

Location (Twp)	Avg DBH of sample trees (cm)	Area affected (ha)	Year	Cumulative percentage of crown dead				No. of trees dead
				0-20	21-40	41-60	> 60	
				No. of trees				
Simcoe District								
Charlotteville	32	315	1977	70	8	12	10	0
			1978	69	9	10	12	0
			1979	58	14	19	8	1
			1980	29	37	25	8	1
			1981	25	41	30	3	1
			1982	23	50	25	1	1
			1983	23	54	21	1	1
			1984	79	16	2	2	1
			1985	88	6	2	3	1
			1986	93	3	2	1	1
Walsingham	22	150	1977	42	35	18	5	0
			1978	40	33	19	4	4
			1979	36	38	16	3	6
			1980	29	38	22	5	6
			1981	19	41	29	1	9
			1982	19	52	18	1	9
			1983	19	50	20	2	9
			1984	72	23	5	1	9
			1985	87	3	0	0	10
			1986	89	0	0	1	10
Chatham District								
Bosanquet (Pinery Provincial Park)	29	2,542	1977	69	7	17	7	0
			1978	69	7	17	7	0
			1979	68	11	16	5	0
			1980	53	19	21	7	0
			1981	48	24	21	7	0
			1982	49	38	9	2	2
			1983	35	39	20	4	2
			1984	80	12	2	2	4
			1985	85	3	3	4	5
			1986	90	1	0	2	7

ABIOTIC DAMAGE

Frost

Small pockets of frost-damaged foliage were frequently noted in woodlots and plantations and on ornamentals in the Wingham, Simcoe and Chatham districts. Damage was recorded on maple (*Acer* spp.), ash (*Fraxinus* spp.), hickory (*Carya* spp.), poplar (*Populus* spp.), basswood (*Tilia americana* L.), black walnut (*Juglans nigra* L.), Norway spruce (*Picea abies* [L.] Karst.) and eastern white pine. Damaged areas were usually 1 ha in area, with high numbers of affected trees at low damage levels (5-25%). There were three noteworthy examples in the following places: Hay Township, Wingham District, where groups of mature roadside maples in rural locales were often 100% affected and experienced 10% foliar loss; Houghton Township, Simcoe District, where 30% of all 1-m white pine in a 2-ha plantation suffered 30% damage to new shoots; and Sombra Township, Chatham District, where 100% of all understory shagbark hickory (*Carya ovata* [Mill.] K. Koch) in a mixed hardwood stand (5 ha) had an average foliar loss of 5%.

Lightning

Multiple lightning strikes in a small pocket (1 ha) of semi-mature white pine and Scots pine caused whole and partial tree mortality on scattered individuals in Charlotteville Township, Simcoe District.

Salt

Infrequent sightings of salt-damaged roadside white pine plantations were made in the Aylmer and Wingham districts. In the Aylmer District the most pronounced damage recorded was to a 3-m plantation in North Dorchester Township, where 20% of the trees examined suffered moderate levels of foliar damage (25-75%). In the Wingham District the most severe damage was noted in Mornington Township where 90% of all 1-m white pines suffered 60% foliar damage on average.

Over all, the highest incidence of salt-affected plantations was along Highway 83 between the towns of Seaforth and Goderich in the Wingham District.

Winter Drying

Winter drying was noted at numerous locations, primarily on hedgerows across the southern portions of the region. Damage levels varied widely. Two notable examples were in Bayham Township, Aylmer District, where 100% of a 1-m hedgerow lost 25% of its foliage and in Romney Township, Chatham District, where 10% of a 0.5-m hedgerow lost 40% of its foliage.

SPECIAL SURVEYS

Eastern White Pine Plantation Survey

The annual plantation survey designed to focus on historically important pests of native species centered on white pine in 1986; the results are summarized in Table 7.

Once again seven plantations across four districts were inspected: two in the 0- to 2-m height class, three in the 2- to 6-m class and two in the 6-m or taller class. Two visits were made to each plantation to allow for seasonal variation in the occurrence of specific forest pests. The first visit was completed by 15 June and the second was scheduled between 14 July and 15 August.

Forest insects were encountered during the surveys, albeit at insignificant damage levels: an adelgid, *Pineus* sp., on new growth in Houghton Township, Simcoe District, and a pine bark aphid, *Cinara* sp., in Yarmouth Township, Aylmer District. Laterals broken or bent by roosting birds were also noted at low incidence rates (5%) on trees in Houghton and Mornington townships in the Simcoe and Wingham districts, respectively.

Armillaria root rot, *Armillaria mellea* (Vahl:Fr.) Kummer, was the single disease organism checked for but was not encountered at any of the survey locations. A mortality rate of 1.3% was noted among young pines (1 m tall) in Houghton Township, Simcoe District, where a herbicide applied to control grass competition killed numerous trees.

Eastern White Pine Cone and Seed Survey

In 1986, white pine cones were submitted for laboratory examination by FIDS staff to assess better the impact of pests on seed cone production. The collection of second-year green cones was taken during the first week of July from several compartments of 20-m trees located on St. Williams Forest Station property near the five corners area on regional road 10 in Charlotteville Township, Simcoe District. Results of this survey are given in Table 8. The majority of the damage (86%) was caused by the white pine coneworm *Eucosma tocullionana* Heinr., and the balance of the damage noted (2%) was attributed to a small midge belonging to the genus *Resseliella*.

Pinewood Nematode, *Bursaphelenchus xylophilus* (Steiner & Buhrer) Nickle

In a continuing effort to document better the distribution of this pest, another 11 suspect samples (primarily of the genus *Pinus)* were submitted for laboratory analysis from eight townships across the Southwestern Region. While some test results are still pending, positive incidence of this nematode has been confirmed in three townships of the 18 sampled to date (Fig. 3). As a point of interest, while the

Table 7. Summary of the results of an eastern white pine plantation survey carried out at seven locations in the Southwestern Region in 1986.

Location (Twp)	Estimated stocking (trees/ha)	Avg ht of sample trees (m)	White pine weevil	Pine spittlebug		Pine bark adelgid	White pine blister rust[a]		Frost	
			Trees with leaders attacked (%)	Trees attacked (%)	No. of colonies per tree	Trees attacked (%)	Trees attacked (%)	Trees with stem cankers (%)	Trees damaged (%)	Total foliage damaged (%)
Aylmer District										
Malahide	1420	26.0	0	100	460	5	0	0	0	0
Yarmouth	2720	1.2	0	0.6	0.6	0	0	0	0	0
Owen Sound District										
Osprey	2000	3.1	0	0	0	0	4.7	0	0	0
Simcoe District										
Charlotteville	836	22.0	0	60	200	1.3	0	0	0	0
Houghton	2750	0.8	0	12.6	3.8	0	0	0	30.0	15.0
Wingham District										
Howick	2570	5.2	2	0	0	9.3	0	0	0	0
Mornington	2390	4.7	0	0	0	0	0	0	0	0

[a]*Cronartium ribicola* J.C. Fischer

Table 8. Summary of the results of the white pine cone and seed survey carried out in the Southwestern Region in 1986.

Location (Twp)	Cones		Seeds
	Sound (%)	Damaged (%)	Loss in damaged cones (%)
Simcoe District			
Charlotteville	12	88	38

majority of the sample submissions (including the positive ones) were taken from the boles of moribund trees, this pest was also recovered from the slash of white spruce (*Picea glauca* [Moench] Voss), white pine and red pine on St. Williams Forest Station property in South Walsingham Township, Simcoe District. During the summer of 1986, in an effort to document better the presence or absence of this pest in areas where suitable host material is scarce, white pine trees were felled to supply host material for detecting this nematode as well as the suspected vector, *Monochamus* beetles.

Acid Rain National Early Warning System (ARNEWS)

During the fall of 1986, the Ontario FIDS Unit established a third study plot (study number 5-26) in southwestern Ontario for the purpose of detecting acid rain symptoms. It is located on provincial crown land at the St. Williams Forest Station in South Walsingham Township, Simcoe District, in an oak stand composed primarily of black oak and red oak on very sandy, well-drained soil. Foliar damage, albeit at low levels (14% on average), was evident on 100% of all trees examined.

This defoliation was caused by the cumulative feeding damage of oak leaf skeletonizer, oak leaftier, *Psilocorsis quercicella* Clem., and a leaf feeding beetle (*Altica* sp.).

Elsewhere, leaf anthracnose was noted damaging all sugar maple trees examined in plot number 5-25 in Howard Township, Chatham District; however, defoliation averaged less than 5%. The single significant defoliator identified in sugar maple plot 5-07, located in West Wawanosh Township, Wingham District, was the maple trumpet skeletonizer; it was recorded on all trees. Foliar damage levels were low (5-25%).

To date, acid rain symptoms have not been confirmed at any of the plots established in the Southwestern Region, as the accumulated field data have not been fully processed.

Figure 3. Pinewood Nematode, *Bursaphelenchus xylophilus* (Steiner & Buhrer) Nickle

Results, by township, of 1985 and 1986 surveys:

positive . . . . . ▼

negative . . . . . ●

Forest Insect and Disease Survey
Great Lakes Forestry Centre

Climatic Data

Forest insects and diseases can be greatly influenced by prevailing weather conditions at specific times critical to their development. Baseline data (Table 9) are included in this report for the purpose of substantiating this fact where possible. Data were supplied by the Atmospheric Environment Service, Department of the Environment.

Two new stations were chosen in 1986 to supply more comprehensive, year-round data: Blyth, to represent the northern portions of the Region, and London airport, to represent the more southerly areas.

Table 9. Summary of mean temperature and total precipitation at two locations in the Southwestern Region in 1986.

Location	Month	Mean temperature			Total precipitation		
		Normal[a] (°C)	Actual (°C)	Deviation from normal (°C)	Normal[a] (mm)	Actual (mm)	Deviation from normal (mm)
Blyth	Jan.	-7.9	-7.0	+0.9	105.8	106.4	+ 0.6
	Feb.	-8.2	-7.4	+0.8	67.2	88.0	+20.8
	Mar.	-2.8	-0.1	+2.7	62.7	94.5	+31.8
	Apr.	5.1	8.6	+3.5	71.9	69.0	- 2.9
	May	11.8	14.2	+2.4	73.7	73.5	- 0.2
	June	17.0	16.2	-0.8	75.0	86.5	+11.5
	July	19.7	20.1	+0.4	76.6	72.0	- 4.6
	Aug.	18.8	18.3	-0.5	96.3	133.0	+36.7
	Sept.	15.1	15.6	+0.5	88.4	353.2	+264.8
	Oct.	8.7	8.9	+0.2	90.3	97.0	+ 6.7
	Nov.	2.5	2.0	-0.5	101.4	49.5	-51.9
	Dec.	-4.3	-1.7	+2.6	116.2	112.5	- 3.7
London Airport	Jan.	-6.6	-5.5	+1.1	75.2	44.6	-30.6
	Feb.	-6.1	-6.1	0.0	60.5	71.5	+11.0
	Mar.	-0.9	0.7	+0.2	75.1	59.4	-15.7
	Apr.	6.4	7.8	1.4	81.2	80.7	- 0.5
	May	12.4	14.5	+2.1	66.9	69.5	+ 2.6
	June	17.9	17.2	-0.7	73.6	100.9	+27.3
	July	20.3	20.9	+0.6	72.4	113.2	+40.8
	Aug.	19.5	18.4	-1.1	80.3	61.4	-18.9
	Sept.	15.4	15.3	-0.1	78.6	236.0	+157.4
	Oct.	9.4	9.4	0.0	73.4	82.7	+10.3
	Nov.	3.1	1.5	-1.6	84.7	50.7	-34.0
	Dec.	-3.5	-1.8	+1.7	87.5	108.3	+20.8

[a]Normal temperature and precipitation are based on the period 1930-1980.